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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,717	08/20/2001	Hideaki Ninomiya	0756-2350	4618

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EXAMINER	
GEYER, SCOTT B	

ART UNIT	PAPER NUMBER
2829	

DATE MAILED: 10/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/931,717	NINOMIYA ET AL.
	Examiner	Art Unit
	Scott B. Geyer	2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 July 2002*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *16 July 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. Figures 1A, 1B, 1C, 2A, 2B, 3, 4A and 4B as amended by the applicant are acceptable to overcome the objections as specified in the previous action. However, formal drawings will be required when the application is allowed.

Specification

2. The specification as amended by the applicant is acceptable. Accordingly, the objections to the specification have been overcome.

Claim Objections

3. Claims 4, 6, 16, 18, 20, 22, 24 and 26 as amended by the applicant are acceptable. Accordingly, the objections to these claims have been overcome.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 2, 4, 6, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321).

As to ***claim 1***, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24). Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/°C. However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients.

Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

As to ***claim 2***, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3).

As to identical ***claims 4 and 6***, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

As to ***claims 27 and 28***, Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 6.5 ppm/^{o}C. However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically

teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

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6. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) and Hirano et al. (5,561,321) as applied to claims 1 and 2 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical ***claims 3 and 5***, neither Sakurai et al. nor Hirano et al. teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide. However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene naphthalate (column 48, lines 47 et seq.). At the time of the invention, it would have

been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. and Hirano et al. with various polymer compounds for making a thin film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

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7. Claims 7, 8, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321).

As to ***claim 7***, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24). Sakurai et al. do not teach thermal shrinkage of the flexible substrate. However, Sakurai et al. do teach heating of the flexible substrate (column 7, lines 15-29). Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal shrinkage, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the heating temperature which the flexible substrate is exposed to would result in overall shrinkage of the substrate. The extent to which the substrate would shrink would be a function of the temperature and the time of exposure of heat. Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/^{o}C.

However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

As to ***claim 8***, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3).

As to identical ***claims 16 and 18***, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

As to ***claims 29 and 30***, Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 6.5 ppm/^{o}C. However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does

not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

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8. Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) and Hirano et al. (5,561,321) as applied to claims 7 and 8 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical ***claims 15 and 17***, neither Sakurai et al. nor Hirano et al. teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide. However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene

naphthalate (column 48, lines 47 et seq.). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. and Hirano et al. with various polymer compounds for making a thin film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

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9. Claims 9, 10, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321) and Hosokawa (5,192,991).

As to ***claim 9***, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24). Sakurai et al. do not teach thermal shrinkage of the flexible substrate. However, Sakurai et al. do teach heating of the flexible substrate (column 7, lines 15-29). Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal shrinkage, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the heating temperature which the flexible substrate is exposed to would result in overall shrinkage of the substrate. The extent to which the substrate would

shrink would be a function of the temperature and the time of exposure of heat. Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/^{o}C nor do they teach a conductive film formed on a substrate by sputtering. However, Hosokawa teaches forming a conductive electrode film by sputtering (column 2, lines 43-44). Further, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step. It would further have been obvious to apply a coating of conductive film by sputtering on the substrate as taught by Hosokawa to provide an electrical connection layer to the polymer substrate layer. As taught by Hosokawa, the conductive film serves as an electrode, a crucial part

of a semiconductor device for operation and sputtering is a process well known in the art for applying even layered coatings of extremely thin dimensions.

As to ***claim 10***, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3). Further, Hosokawa teaches an amorphous semiconductor layer applied by plasma CVD (column 2, lines 46-48).

As to identical ***claims 20 and 22***, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

As to ***claims 31 and 32***, Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 6.5 ppm/^{o}C. However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal

expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

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10. Claims 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549), Hirano et al. (5,561,321) and Hosokawa (5,192,991) as applied to claims 9 and 10 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical ***claims 19 and 21***, neither Sakurai et al., Hirano et al. nor Hosokawa teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide. However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene naphthalate (column 48, lines 47 et seq.). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al., Hirano et al. and Hosokawa with various polymer compounds for making a thin film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

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11. Claims 11, 12, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321) and Nakata et al. (6,074,893).

As to ***claim 11***, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24). Sakurai et al. do not teach thermal shrinkage of the flexible substrate. However, Sakurai et al. do teach heating of the flexible substrate (column 7, lines 15-29). Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal shrinkage, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the heating temperature which the flexible substrate is exposed to would result in overall shrinkage of the substrate. The extent to which the substrate would shrink would be a function of the temperature and the time of exposure of heat. Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/^{o}C nor do they teach forming a predetermined pattern over the substrate by screen printing. However, Nakata et al. teach forming a predetermined pattern of bumps over a substrate by screen printing (column 5, lines 64 et seq., continued to column 6, lines 1-33). Further, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to

employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step. It would further have been obvious to form a predetermined pattern on a substrate by screen printing as taught by Nakata et al. to provide a pattern of bumps for further connection of the substrate a chip or another substrate, as is common in the art. Screen printing is well known in the art as an efficient process for applying layers of various materials including, but not limited to bump electrodes, solder paste and adhesives.

As to ***claim 12***, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3). Further, Nakata et al. teach laser processing as a means to form a predetermined pattern, for example grooves, on a substrate (column 18, lines 23-31).

As to identical ***claims 24 and 26***, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

As to ***claims 33 and 34***, Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 6.5 ppm/^{o}C. However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

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12. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549), Hirano et al. (5,561,321) and Nakata et al. (6,074,893) as applied to claims 11 and 12 above, respectively, and further in view of Sheppard et al. (6,111,324).

As to identical ***claims 13 and 14***, neither Sakurai et al., Hirano et al. nor Nakata et al. teach aligning the substrate by alignment means of the holding frame. However, Sheppard et al. teach a frame having alignment and index holes for processing of substrates in a semiconductor manufacturing environment (column 1, lines 55-63). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al., Hirano et al. and Nakata et al. with a means to align the substrate during processing as taught by Sheppard et al. It would be necessary to accurately align the substrate for proper placement of successive layers, patterning of grooves, etching or any various processing steps needed to complete the semiconductor device.

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13. Claims 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549), Hirano et al. (5,561,321) and Nakata et al. (6,074,893) as applied to claims 11 and 12 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical ***claims 23 and 25***, neither Sakurai et al., Hirano et al. nor Nakata et al. teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide. However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene naphthalate (column 48, lines 47 et seq.). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al., Hirano et al. and Nakata et al. with various polymer compounds for making a thin

film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

Response to Arguments

14. Applicant's arguments filed 7-16-02 have been fully considered but they are not persuasive. Applicant has recited sections of the MPEP related to establishing a prima facie case of obviousness and that the previous office action fails to address three points:

First, according to the present invention, that warp and wrinkle of the flexible substrate are decreased as a result of using a frame with a thermal expansion coefficient of 10 ppm/^{o}C or less.

Second, leveling of the flexible substrate adhered to the holding frame can be carried out by heating so as thermal shrink the flexible substrate by 0.2% or more, even if the flexible substrate has warp that occurs after being adhered to the frame.

Third, with respect to claim 9-12, steps such as forming a semiconductor film by plasma CVD, forming a predetermined pattern by screen printing, forming a conductive film by sputtering and forming a predetermined pattern by laser processing are performed over the flexible substrate to form a solar cell.

As to the first point, the above paragraphs fully cover the recited limitation of a frame having a thermal expansion coefficient of 10 ppm/^{o}C or less. Since all materials have a thermal expansion coefficient value, as an inherent property of that material, it would be obvious to use a material with a thermal expansion coefficient value in the

range recited of 10 ppm/°C or less without undue experimentation, especially given that the prior art recites materials such as metals and ceramics.

As to the second point, it is inherently known that a plastic flexible substrate will shrink and warp when subjected to heat cycles, as is plainly cited in applicants admitted prior art, on page 2, first full paragraph of newly amended specification.

As to the third point, in regards to forming a semiconductor film by plasma CVD, forming a predetermined pattern by screen printing, forming a conductive film by sputtering and forming a predetermined pattern by laser processing, Hosokawa and Nakata, which are references of related analogous art to applicant's claimed invention, have been cited to teach the above method limitations as well known in the art of semiconductors and semiconductor manufacturing. Thus a prima facie case of obviousness has been established. Further, claims 9-12 make no mention of any reference to solar cells.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott B. Geyer whose telephone number is (703) 306-5866. The examiner can normally be reached on weekdays, between 10:00am - 6:30pm. The examiner may also be reached via e-mail: *scott.geyer@uspto.gov*

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael J. Sherry can be reached on (703) 308-1680. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

S.B.G.

S.B.G.
September 30, 2002

9/30/02

MICHAEL SHERRY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800